SUMMARY OF PROPOSED COMMITTEE DRAFT:

BILL 25 (2019), CD1
RELATING TO THE ADOPTION OF THE STATE ENERGY CONSERVATION CODE.

The **PROPOSED CD2** makes the following amendments to SECTION 3 of the bill:

A. Amends item (12) to amend Subsection C402.2.3 ("Thermal resistance of above-grade walls) to include reference to mass walls. In condition 1 of the exception, deletes references to overhangs with a projection factor equal to or greater than 0.3.

B. Adds a new item (13) to amend Table C402.4 ("Building Envelope Fenestration Maximum U-Factor and SHGC Requirements") by amending Exception b to provide an exception for jalousie windows. Renumbers subsequent items.

C. Adds a new item (15) to amend Subsection C402.4.5 ("Area-Weighted SHGC") to provide that for commercial buildings, an area-weighted average of fenestration products will be permitted to satisfy solar heat gain coefficient ("SHGC") requirements. Also adds an exception for jalousie windows. Renumbers subsequent items.

D. Adds a new item (18) to amend Subsection C406.1 ("Requirements") to require buildings to comply with at least one of the requirements set forth in that subsection. Renumbers subsequent items.

E. Amends renumbered item (20) relating to electric vehicles to add Subsection C406.8, Subsection C406.8.1, Table C406.8.1, Subsection C406.8.2, and Table C406.8.2. The new provisions:

    1. Require that all newly-created parking stalls for newly-constructed residential multi-unit and commercial buildings comply with one of the electric vehicle readiness compliance pathways specified in Subsection C406.8.1 or Subsection C406.8.2;

    2. Delete the "AC Level 1" row in Table C406.8.1 ("Charge Methods Electrical Rating") and amend the "AC Level 2" row; and

    3. Add Table C406.8.2 ("Electric Vehicle Readiness Points-Based Compliance Values").

F. Amends renumbered item (27) to revise Subsection R401.2.1 ("Tropical zone") to delete condition 13 relating to jalousie window requirements.

G. Amends renumbered item (28) to revise Table R402.1.2 ("Insulation and Fenestration Requirements by Component") to:

1. Under "Climate Zone 1 – Mass Wall R-Value," lists 3/4 or NR;

2. Amends footnote j relating to mass wall R-values; and

3. Adds a new footnote k to exempt jalousie windows from SHGC requirements.

H. Amends renumbered item (29) to revise Table R402.2.1 ("Window SHGC Requirements"), to add an exception for jalousie windows.

I. Adds a new item (30) to amend Subsection R402.2.5 ("Mass walls"), to revise the requirements and exceptions. Renumbers subsequent items.

J. Amends renumbered item (31) to revise Subsection R402.3.2 ("Glazed fenestration SHGC") to add an exception for jalousie windows.

K. Adds a new item (32) to add Subsection R402.4.1.3 ("Sampling") to regulate air infiltration/duct testing for production home buildings. Renumbers subsequent items.

L. Amends renumbered item (33) to revise Subsection R403.5.5 ("Solar water heating") to require that new single-family dwellings include a solar water heater system that meets the standards established by HRS Section 269-44, unless a variance is approved pursuant to HRS Section 196.5.

M. Amends renumbered item (34) to revise Subsection R403.6.2 ("Ceiling fans – Mandatory") to require whole house mechanical ventilation systems to comply with efficacy requirements of Table R403.6.1. Provides an exception for production home building.

N. Amends renumbered item (35) to add a new Subsection R404.2 ("Solar conduit and electrical panel readiness") to set forth solar conduit and electrical panel readiness requirements.

O. Amends renumbered item (36) to add a new Subsection R404.3 relating to electric vehicle readiness, to require that in addition to what is required by the Electrical Code, if a building permit application involves the installation of an electrical panel and parking area for a detached dwelling or duplex, a dedicated receptacle for an electric vehicle must be provided with a minimum AC Level 2 charge.

P. Adds a new item (38) to revise Table R407.1 ("Points Option") to add provisions relating to mass walls. Renumbers subsequent items.

Q. Makes miscellaneous technical and nonsubstantive amendments.

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE _____

BILL 25 (2019), CD2

PROPOSED

A BILL FOR AN ORDINANCE

RELATING TO THE ADOPTION OF THE STATE ENERGY CONSERVATION CODE.

BE IT ORDAINED by the People of the City and County of Honolulu:

SECTION 1. Purpose. The purpose of this ordinance is to regulate the design and construction of residential and commercial buildings for the effective use of energy through the adoption of the State Energy Conservation Code (2017), subject to the local amendments herein.

SECTION 2. Chapter 32, Revised Ordinances of Honolulu 1990 ("Building Energy Conservation Code") is repealed.

SECTION 3. The Revised Ordinances of Honolulu 1990 is amended by adding a new Chapter 32 to read as follows:

"Chapter 32.

BUILDING ENERGY CONSERVATION CODE

Article 1. Building Energy Conservation Code

Sec. 32-1.1 Adoption of the State Energy Conservation Code.

The State Energy Conservation Code (SECC), as adopted by the State of Hawaii on February 14, 2017, which adopts, with modifications, the International Energy Conservation Code, 2015 edition (IECC), as copyrighted by the International Code Council, is adopted by reference and made a part hereof, subject to the following amendments, which, unless stated otherwise, are in the form of amendments to the IECC 2015 edition:

(1) Amending Section C101.1. Section C101.1 is amended to read:

C101.1 Title

This code shall be known as the Building Energy Conservation Code (BECC) of the City and County of Honolulu (CCH) or the CCH BECC. It is referred to herein as "this code."

(2) Amending Section C103.1 Section C103.1 is amended to read:

C103.1 General. When the requirements in this code apply to a building as specified in Section C101.4, plans, specifications, or other construction documents submitted for a building, electrical, or plumbing permit required by the jurisdiction must comply with this code and will be prepared, designed, approved, and observed by a design professional. The responsible design professional shall provide on the plans a signed statement certifying that the project is in compliance with this code.

Exception: Any building, electrical or plumbing work that is not required to be prepared, designed, approved or observed by a licensed professional architect or engineer pursuant to Chapter 464, Hawaii Revised Statutes (HRS).

(3) Amending Subsection C103.2. Subsection C103.2 is amended to read:

C103.2. Information on construction documents. Construction documents must be drawn to scale upon suitable material or submitted in an electronic form acceptable to the code official. Construction documents must be of sufficient clarity to indicate the location, nature, and extent of work proposed and show, in sufficient detail, pertinent data, and features of the building, systems, and equipment as herein governed. Details must include, but are not limited to the following, as applicable:

1. Insulation materials and their thermal resistance (*R*-values);
2. Fenestration U-Factors and solar heat gain coefficients (SHGCs);
3. Area-weighted U-factor and SHGC calculations;
4. Mechanical system design criteria and power requirements;
5. Mechanical and service water heating system and equipment types, sizes and efficiencies;
6. Economizer description;
7. Equipment and system controls;
8. Fan motor horsepower (hp) and controls;

9. Duct sealing, duct and pipe insulation and location;

10. Lighting fixtures schedule with wattage and control narrative;

11. Location of daylight zones on floor plans; and

12. Air sealing details.

All plans, reports, and documents must be certified by the project design professional or engineer, using the appropriate form shown below and submitted to the code official certifying that the plans and documents conform to the requirements of this code.

CITY AND COUNTY OF HONOLULU
REVISED ORDINANCES OF HONOLULU 1990
CHAPTER 32

To the best of my knowledge, this project's design substantially conforms to the Building Energy Conservation Code for:

_____ Building Component Systems
_____ Electrical Component Systems
_____ Mechanical Component Systems

Signature: _____ Date: _____
Name: _____
Title: _____
License No.: _____

Include only those items that the signator is responsible for. This block shall be on the first sheet of the pertinent plan, e.g. architectural, electrical, and mechanical. The above may be submitted separately to the Code Official in a letter including the identification of the building.

(4) Amending Subsection C104. Subsection C104 is amended to read:

C104.2 Required inspections. Inspections must comply with ROH Chapter 16.

(5) Amending Subsection C104.2.6. Subsection C104.2.6 is amended to read:

C104.2.6 Final inspection. The building must have a final inspection and cannot be occupied until approved. The final inspection must include verification of the installation of and proper operation of all required building controls, and documentation verifying activities associated with required building

commissioning have been conducted and any findings of noncompliance corrected.

(6) Amending Subsection C104.6. Subsection C104.6 is amended to read:

C104.6 Re-inspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections must be made to achieve compliance with this code. The work or installation must then be resubmitted to the responsible code official for inspection and testing as required by this code.

(7) Amending Subsection C104.7. Subsection 104.7 is amended to read:

C104.7 Approval. After a building passes all tests and inspections required by this code, the responsible design professional must submit a confirmation letter to the code official certifying that the building has passed all of the tests and inspections required and stating that the building owner has received the Preliminary Commissioning Report, as required by IECC Section C408.2.4.

(8) Amending Subsection C107.1. Subsection C107.1 is amended to read:

C107.1 Fees. Prescribed fees must comply with ROH Chapter 18.

(9) Amending Subsection C108.1. Subsection C108.1 is amended to read:

C108.1 Authority. Stop work order must comply with ROH Chapter 18.

(10) Amending Subsection C109.1. Subsection C109.1 is amended to read:

C109.1 General. Board of Appeals must comply with ROH Chapter 16.

(11) Amending Section C202. Section C202 is amended by:

(a) Amending the definition of "CODE OFFICIAL" to read:

CODE OFFICIAL means the Director of Planning and Permitting or the director's authorized representative.

(b) Amending the definition of "DWELLING UNIT" to read:

DWELLING UNIT means a building or portion thereof that contains living facilities, including permanent provisions for living, sleeping, eating,

cooking and sanitation, as required by this code, for not more than one family, or a congregate residence for 16 or fewer persons.

(c) Adding the following definition of "RENEWABLE ENERGY" immediately before the definition of "REPAIR:"

RENEWABLE ENERGY by reference to HRS §269-91, renewable energy means energy generated or produced using the following sources:

1. Wind;
2. Sun;
3. Falling water;
4. Biogas, including landfill and sewage-based digester gas;
5. Geothermal;
6. Ocean water, currents and waves, including ocean thermal energy conversion;
7. Biomass, including biomass crops, agricultural, and animal residues and waste and municipal solid waste and other solid waste;
8. Biofuels; and
9. Hydrogen produced from renewable energy sources.

(12) Amending Subsection C402.2.3. Subsection C402.2.3 is amended to read:

C402.2.3 Thermal resistance of above-grade walls. The minimum *R*-value of materials installed in the wall cavity between framing members and continuously on the wall shall be as specified in Table C402.1.3, based on framing type and construction materials used in the wall assembly.

Exception: Continuous insulation for wood-framed, metal-framed, and mass walls are not required when one of the following conditions are met:

1. Walls have a covering with a reflectance of equal to or greater than 0.64;

2. Walls have overhangs with a projection factor equal to or greater than 0.3. The projection factor is the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first floor level to the bottom-most point of the overhang; or

3. Concrete, concrete masonry units (CMU), and similar mass walls are six inches or greater in thickness.

The *R*-value of integral insulation installed in CMUs shall not be used in determining compliance with Table C402.1.3. Mass walls must include walls:

1. Weighing not less than 35 psf (170 kg/m^2) of wall surface area.

2. Weighing not less than 25 psf (120 kg/m^2) of wall surface area where the material weight is not more than 120 psf (1900 kg/m^3).

3. Having a heat capacity exceeding 7 Btu/ft^2°F (144 kJ/m^2 • K).

4. Having a heat capacity exceeding 5 Btu/ft^2°F (103 kJ/m^2• K), where the material weight is not more than 120 pcf (1900 kg/m^3).

(13) Amending Table C402.4. Table C402.4 ("Building Envelope Fenestration Maximum U-Factor and SHGC Requirements") is amended by amending Exception "b" to read:

b. Jalousie windows are excepted from SHGC requirements.

(14) Amending Subsection C402.4.1.2. Subsection C402.4.1.2 is amended to read:

C402.4.1.2 Increased skylight area with daylight responsive controls. The skylight area shall be permitted to be not more than five percent of the roof area provided *daylight responsive controls* complying with Section C405.2.3.1 are installed in *daylight zones* under skylights.

Exception: Spaces where the designed general lighting power densities are equal to or less than 60 percent of the lighting power densities specified in Table C405.2(1) or C405.4.2(2).

(15) Amending Subsection C402.4.3.5. Subsection C402.4.3.5 is amended to read:

C402.4.5 Area-Weighted SHGC. In commercial buildings, an area-weighted average of fenestration products will be permitted to satisfy SHGC requirements.

Exception: Jalousie windows are excepted from SHGC requirements.

(16) Adding Subsection C403.2.4.2.4. Subsection C403.2.4.2.4 is added to read:

C403.2.4.2.4 Door switches. Opaque and glass doors opening to the outdoors in hotel and motel sleeping units, guest suites, and timeshare condominiums must be provided with controls that disable the mechanical cooling or reset the cooling setpoint to 90 degrees Fahrenheit or greater within five minutes of the door opening. Mechanical cooling may remain enabled if the outdoor air temperature is below the space temperature.

(17) Amending Subsection C405.2. Subsection C405.2 is amended by amending the exceptions to read:

Exception: Spaces that use 60 percent or less of designated watts per square foot are exempt from Sections C405.2.2 (Time switch controls) and C405.2.3 (Daylight-responsive controls).

(18) Amending Subsection C406.1. Subsection C406.1 is amended to read:

C 406.1 Requirements. In addition to the requirements specified in Subsection C406.8 ("Electric vehicle infrastructure"), buildings must comply with at least one of the following:

1. More efficient HVAC performance in accordance with Subsection C406.2;

2. Reduced lighting power density system in accordance with Subsection C406.3;

3. Enhanced lighting controls in accordance with Subsection C406.4;

4. On-site supply of renewable energy in accordance with Subsection C406.5;

5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Subsection C406.6; or

6. High-efficiency service water heating in accordance with Subsection C406.7.

(19) Amending Subsection C406.3. Subsection C406.3 is amended to read:

C406.3 Reduced lighting power density. The total interior lighting power (watts) of the building shall be determined by using 80 percent of the lighting power values specified in Table C405.4.2(1) times the floor area for the building types, or by using 80 percent of the lighting power values specified in Table C405.4.2(2) times the floor area for the building type, or by using 80 percent of the interior lighting power allowance calculated by the Space-by-Space Method in Section C405.4.2.

(20) Adding Subsection C406.8, Subsection C406.8.1, Table C406.8.1, Subsection C406.8.2, and Table C406.8.2. Subsection C406.8, Subsection C406.8.1, Table C406.8.1, Subsection C406.8.2, and Table C406.8.2 are added to read:

C406.8 Electric vehicle infrastructure. All newly-created parking stalls for newly-constructed residential multi-unit and commercial buildings must comply with one of the electric vehicle readiness compliance pathways specified in Subsection C406.8.1 or Subsection C406.8.2.

C406.8.1 Baseline percentage electric vehicle readiness compliance path. Newly-constructed parking stalls for new and existing residential multi-unit buildings that add eight or more new parking stalls must be electric vehicle charger ready for at least 25 percent of the newly-added parking stalls. Newly-constructed parking stalls for new and existing commercial buildings that add 12 or more new parking stalls must be electric vehicle charger ready for at least 25 percent of the newly-added parking stalls. As used in this section, "electric vehicle charger ready" means that sufficient wire, conduit, electrical panel service capacity, overcurrent protection devices, and suitable termination points are provided to connect to a charging station capable of providing simultaneously an AC Level 2 charge per required parking stall. Charge method electrical ratings are provided in Table C406.8.1

Table C406.8.1
CHARGE METHODS ELECTRICAL RATING

Charge Method	Normal Supply Voltage (Volts)	Maximum Current (Amps – Continuous)	Supply power
AC Level 2	208 to 240V AC, 1-phase	Minimum 32A	208/240VAC/20-100A (16-80A continuous)

C406.8.2 Points-based electric vehicle readiness compliance path. Newly-constructed parking stalls for new and existing residential multi-unit buildings that add eight or more newly-added parking stalls must be electric vehicle charger ready or equipped to achieve no less than one point for every four parking stalls based on the EV charger capacity requirements and values listed in Table C406.8.2. Newly-constructed parking stalls for new and existing commercial buildings that add twelve or more newly-added parking stalls must be electric vehicle charger ready or equipped to achieve no less than one point for every four parking stalls based on the capacity requirements and values listed in Table C406.8.2.

Compliance requirements under this subsection for retail establishments, as defined in ROH Chapter 21, will be reduced by 20 percent.

Compliance requirements under this subsection for affordable housing units offered for sale or rent to households earning at or below 140 percent of the area median income for Honolulu will be reduced by 20 percent.

Compliance requirements under this subsection for affordable housing units offered for sale or rent to households earning at or below 60 percent of the area median income for Honolulu will be reduced by 40 percent.

For purposes of compliance under this subsection, building developers may aggregate points across multiple projects and phases; provided that each individual project achieves no less than 10 percent compliance or adds a minimum of one electric vehicle charger ready parking space per project, whichever is greater. All aggregation plans under this subsection must be identified and verified by a certified design professional and the building official at the time of permitting.

Table C406.8.2
ELECTRIC VEHICLE READINESS POINTS-BASED COMPLIANCE VALUES

			Compliance Points		
Electric Vehicle Charger Capacity Level	Charging Rate (kW) at 208 Vac	Time to charge 50 kW battery (hrs)	Dedicated EV Ready Stalls	Common Area EV Ready Stalls	Common Area Stall w/ EV Charging Equipment Installed
Level 2, Minimum 32A	**6.7**	7.5	1	2	3
Level 2, 64A to 80A	**13.3**	3.8	2	3	6
DCFC 50 kW (480/277 Vac 3-phase)	**50.0**	1.0	7	11	22

(21) Amending Subsection C408.2.4.1. Subsection C408.2.4.1 is amended to read:

C408.2.4.1 Acceptance of reports. Buildings, or portions thereof, shall not be considered acceptable for a certificate of occupancy until the *code official* has received a letter of transmittal from the building owner acknowledging that the building owner or owner's authorized agent has received the Preliminary Commissioning Report.

(22) Amending Subsection C408.3.1. Subsection C408.3.1 is amended to read:

C408.3.1 Functional testing. Prior to issuance of a certificate of occupancy, the *licensed design professional* shall provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the *construction documents* and manufacturer's instruction. Functional testing must be in accordance with Sections C408.3.1.1 and C408.3.1.2 for the applicable control type.

(23) Amending Subsection C501.4. Subsection C501.4 is amended to read:

C501.4 Compliance. *Alterations, repairs, additions* and changes of occupancy to, or relocation of, existing buildings and structures must comply with the provisions and regulations for *alterations, repairs, additions* and changes of occupancy to, or relocation of, respectively, required by this code.

(24) Amending Subsection C503.3.1. Subsection C503.3.1 is amended to read:

C503.3.1 Roof replacement. *Roof replacements* must comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the *building thermal envelope* and contains insulation entirely above the roof deck.

Exception: The following alterations need not comply with the requirements for new construction, provided the energy use of the building is not increased. When uninsulated roof sheathing is exposed during alteration, two of the following must be installed:

1. Table C402.3 (solar reflectance); Energy Star compliant roof covering;

2. Radiant barrier;

3. Attic ventilation via solar attic fans or ridge ventilation or gable ventilation; and/or

4. Two or more of the exceptions listed in Table C402.3.

(25) Amending Subsection R103.1. Subsection R103.1 is amended to read:

R103.1 General. Construction documents and other supporting data must be submitted to indicate compliance with this code. The construction documents shall be prepared, designed, approved and observed by a duly licensed design professional, as required by HRS Chapter 464. The responsible design professional must provide on the plans a signed statement certifying that the project is in compliance with this code.

Exception: Any building, electrical or plumbing work that is not required to be prepared, designed, approved or observed by a licensed professional architect or engineer, pursuant to HRS Chapter 464. Specifications and necessary computations need not be submitted when authorized by the *Code Official*.

(26) Amending Subsection R401.2. Subsection R401.2 is amended to read:

R401.2 Compliance. Projects must comply with one of the following:

1. Sections R401.3 through R404;

2. Section R405 and the provisions of Sections R401 through R404 labeled "mandatory";

3. An energy rating index (ERI) approach in Section R406; or

4. The Tropical Zone requirements in Section R401.2.1.

(27) Amending Subsection R401.2.1. Subsection R401.2.1 is amended to read:

R401.2.1 Tropical zone. *Residential buildings* in the tropical zone at elevations below 2,400 feet (731.5 m) above sea level must comply with this chapter by satisfying the following conditions:

1. Not more than one-half of the area of the *dwelling unit* is air conditioned.

2. The *dwelling unit* is not heated.

3. Solar, wind, or another renewable energy source supplies not less than 90 percent of the energy for service water heating.

4. Glazing in conditioned space must have a maximum *solar heat gain coefficient* as specified in Table R402.2.1.

5. Skylights in dwelling units must have a maximum Thermal Transmittance (U-factor), as specified in Table R402.1.2.

6. Permanently installed lighting is in accordance with Section R404.

7. The roof/ceiling complies with one of the following options:

   a. Comply with one of the roof surface options in Table C402.3 and install R-13 insulation or greater; or

   b. Install R-19 insulation or greater.

   If present, attics above the insulation are vented and attics below the insulation are unvented.

   Exception: The roof/ceiling assembly are permitted to comply with Section R407.

8. Roof surfaces have a minimum slope of one fourth inch per foot of run. The finished roof does not have water accumulation areas.

9. Operable fenestration provides ventilation area equal to not less than 14 percent of the floor area in each room. Alternatively, equivalent ventilation is provided by a ventilation fan.

10. Bedrooms with exterior walls facing two different direction have operable fenestration or exterior walls facing two different directions.

11. Interior doors to bedrooms are capable of being secured in the open position.

12. Ceiling fans or whole house fans are provided for bedrooms and the largest space that is not used as bedroom.

13. Walls, floors and ceilings separating air conditioned spaces from non-air conditioned spaces shall be constructed to limit air leakage in accordance with the requirements in Table R402.4.1.1.

(28) Amending Table R402.1.2. Table R402.1.2 is amended to read:

Table R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e, k]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	NR	0.75	0.25	30	13	¾ or *NR*[j]	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in climate zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. The first value is cavity insulation, the second value is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation.

i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

j. Exception: R-value for mass walls are not required if mass walls meet one of the following requirements: (1) have a reflectance ≥ 0.64; (2) have overhangs with a projection factor ≥ 0.3; or (3) are ≥ 6 inches in thickness.

k. Exception: Jalousie windows are excepted from SHGC requirements.

(29) Amending Table R402.2.1. Table R402.2.1 is amended to read:

Table R402.2.1.
WINDOW SHGC REQUIREMENTS

Projection Factor of overhang from base of average window sill	SHGC
< 0.30	0.25
0.30 - 0.50	0.40
≥ 0.50	N/A

a. Exception: North-facing windows with pf > 0.20 are exempt from the SHGC requirement. Overhangs shall extend two feet on each side of window or to nearest wall, whichever is less.

b. Exception: Jalousie windows are excepted from SHGC requirements.

(30) Amending Subsection R402.2.5. Subsection R402.2.5 is amended to read:

R.402.2.2.5 Mass walls. Mass walls for the purposes of this chapter will be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth), solid timber/logs, or any other wall having a heat capacity equal to or exceeding 6 Btu/ft^2 x °F (123 kJ/m^2 x K). The minimum thermal resistance (R-value) of mass walls must be as specified in Table R402.1.2.

Exception: Insulation or r-value for mass walls, indicated in Table R402.1.2, is not required when one or more of the following conditions is met:

1. Walls have a covering with a reflectance of ≥ 0.64;

2. Walls have overhangs with a projection factor equal to or greater than 0.3. The projection factor is the horizontal distance from the surface of the wall to the farthest most point of the overhand divided by the vertical distance from the first floor level to the bottom most point of the overhang; or

3. Concrete, concrete masonry units (CMU), and similar mass walls are 6 inches or greater in thickness.

(31) Amending Subsection R402.3.2. Subsection R402.3.2 is amended to read:

R402.3.2 Glazed fenestration SHGC. Fenestration must have a maximum *solar heat gain coefficient* as specified in Table R402.1.2. An area-weighted average of fenestration products more than 50 percent glazed shall be permitted to satisfy the SHGC requirements.

Exception: *Dynamic glazing* is not required to comply with this section when both the lower and higher labeled SHGC already comply with the requirements of Table R402.1.2.

Exception: Jalousie windows are excepted from SHGC requirements.

(32) Adding Subsection R402.4.1.3. Subsection R402.1.3 is added to read:

R402.1.3 Sampling. For builders of multiple single homes and multi-family units of similar construction type and envelope systems (i.e. production home building), air infiltration/duct testing may be completed by following Chapter 6 ("Standard for Sampled Ratings"), of the current Residential Energy Service Network (RESNET) National Home Energy Rating System Standards.

(33) Adding Subsection R403.5.5. Subsection R403.5.5 is added to read:

R403.5.5 Solar water heating. No building permit may be issued for a new single-family dwelling that does not include a solar water heater system that meets the standards established by HRS Section 269-44, unless a variance is approved pursuant to HRS Section 196.5.

1. A variance application must be submitted by an architect or mechanical engineer licensed under HRS Chapter 464, who attests that:

    a. Installation is impracticable due to poor solar resource;

    b. Installation is cost-prohibitive based upon a life cycle cost-benefit analysis that incorporates the average residential utility bill and the cost of the new solar water heater system with a life cycle that does not exceed 15 years;

    c. A renewable energy technology system, as defined in HRS Section 235-12.5, is substituted for use as the primary energy source for heating water; or

d. A demand water heater device approved by Underwriters Laboratories, Inc. is installed; provided that at least one other gas appliance is installed in the dwelling. For purposes of this paragraph, "demand water heater" means a gas-tankless instantaneous water heater that provides hot water only as it is needed.

2. With respect to paragraphs 1.a and 1.b, the burden lies with the applicant for a variance to demonstrate that a solar water heater system, regardless of location or circumstance, is not cost effective in the context of a 30-year mortgage term.

3. With respect to paragraph 1.d, a variance for the installation of a demand water heater device may only apply if the applicant for a variance is the party that will ultimately pay for the energy cost consumption. A demand water heater device may be approved by a safety certification company that is comparable to Underwriters Laboratories, Inc. (for example, CSA Group).

(34) Adding Subsection R403.6.2. Subsection R403.6.2 is added to read:

R403.6.2 Ceiling fans (Mandatory). A ceiling fan or whole house fan is provided for bedrooms and the largest space that is not used as bedroom; provided that the whole house mechanical ventilation system complies with the efficacy requirements of Table R403.6.1.

Exception: For production home building, ceiling fan junction boxes must be provided for bedrooms and the largest interior space that is not used as a bedroom, and ceiling fan equipment must be provided as a buyer's option.

(35) Adding Subsection R404.2. Subsection R404.2 is added to read:

R404.2 Solar conduit and electrical panel readiness. Construction documents must indicate a location for inverters, metering equipment, battery equipment, energy storage equipment, and other equipment necessary to interconnect a residence with on-site solar energy generation facilities with the electrical grid in compliance with applicable laws, statutes, and utility tariffs. Construction documents must indicate a pathway for routing of conduit from the solar panel location to the point of interconnection with electrical service. New residential buildings must install for each residence an electrical panel with reserved space to accommodate not less than a five Kilowatt (AC) photovoltaic system. All feeders and electrical distribution equipment, including switchgear,

switchboards, and panelboards, that will be fed simultaneously by the electrical grid and other power sources must be sized to support the installation of future solar energy generation systems per the interconnection requirements of the Electrical Code. New residential buildings must also install conduit not less than one and one-half inches to provide a pathway from the electrical panel to the inverter location and from the inverter location to the underside of the roof sufficient to allow future installation of solar equipment. If conduits are to be installed between separate buildings or other structures, construction documents must provide sufficient details to show that compliance with the Electrical Code's restrictions on the number of power supplies to each building or other structure has been examined.

(36) Adding Subsection R404.3. Subsection R404.3 is added to read:

R404.3 Electric Vehicle Readiness. In addition to what is required by the Electrical Code, if a building permit application involves the installation of an electrical panel and parking area for a detached dwelling or duplex, a dedicated receptacle for an electric vehicle must be provided with a minimum AC Level 2 charge, as defined in this code.

(37) Amending Table R405.5.2(1). Table R405.5.2(1) is amended to read:

Table R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Heating Systems	Fuel type: Same as proposed design Efficiencies Electric: Air-source heat pump with prevailing federal minimum standards Nonelectric furnaces: Natural gas furnace with prevailing federal minimum standards Nonelectric boilers: Natural gas boiler with prevailing federal minimum standards Capacity: Sized in accordance with Section R403.7	As proposed As proposed As proposed As proposed As proposed
Cooling systems	Fuel type: Electric Efficiency: In accordance with prevailing federal minimum standards Capacity: Sized in accordance with Section R403.7	As proposed As proposed

Service water heating	Fuel type: Same as proposed design Efficiency: In accordance with prevailing federal minimum standards Use: Same as proposed design	As proposed As proposed gal/day=30+(10x *Nbr*)

(38) Amending Table R407.1. Table R407.1 is amended to read:

Table R407.1
POINTS OPTION

Walls		**Standard Home Points**	**Tropical Home Points**
Wood Framed			
	R-13 Cavity Wall Insulation	0	1
	R-19 Roof Insulation	-1	0
	R-19 Roof Insulation + Cool roof membrane[1] or Radiant Barrier[3]	0	1
	R-19 Roof Insulation + Attic Venting[2]	0	1
	R-30 Roof Insulation	0	1
	R-13 Wall Insulation + high reflectance walls[4]	1	2
	R-13 Wall insulation + 90% high efficacy lighting and Energy Star Appliances[5]	1	2
	R-13 Wall insulation + exterior shading wpf=0.3[b]	1	2
	Ductless Air Conditioner[7]	1	1
	1.071 X Federal Minimum. SEER for Air Conditioner	1	1
	1.142 X Federal Minimum SEER for Air Conditioner	2	2
	No air conditioning installed	Not applicable	2
	House floor area ≤ 1,000 ft^2	1	1
	House floor area ≥ 2,500 ft^2	-1	-1
	Energy Star Fans[8]	1	1
	Install 1 kw or greater of solar electric	1	1

Metal Framed			
	R-13 + R-3 Wall Insulation	0	1
	R-13 Cavity Wall insulation + R-0	-1	0
	R-13 Wall Insulation + high reflectance walls[4]	0	1
	R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances[5]	1	2
	R-13 Wall Insulation + exterior shading wpf=0.3[6]	0	1
	R-30 Roof Insulation	0	1
	R-19 Roof Insulation	-1	0
	R-19 + Cool roof membrane[1] or Radiant Barrier[3]	0	1
	R-19 Roof Insulation + Attic Ventilation	0	1
	Ductless Air Conditioner[7]	1	1
	1.071 X Federal Minimum SEER for Air Conditioner	1	1
	1.142 X Federal Minimum SEER for Air Conditioner	2	2
	No air conditioning installed	Not Applicable	2
	House floor area ≤ 1,000 ft^2	1	1
	House floor area ≥ 2,500 ft^2	-1	-1
	Energy Star Fans[7]	1	1
	Install 1 kw or greater of solar electric	1	1
Mass Walls			
	R- 3/4 Wall Insulation	0	1
	R-0 Wall Insulation	-1	0
	R-0 Wall Insulation + high reflectance walls[4]	0	1
	R-0 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances[5]	1	2
	R-0 Wall Insulation + exterior shading WPF = 0.3[6]	0	1
	R-19 Roof Insulation	-1	0
	R-19 Roof Insulation + Cool roof membrane[1] or Radiant Barrier[3]	0	1
	R-19 Roof Insulation + Attic Venting	0	1

	R-30 Roof Insulation	0	1
	Ductless Air Conditioner[7]	1	1
	1.071 X Federal Minimum SEER for Air Conditioner	1	1
	1.142 X Federal Minimum SEER for Air Conditioner	2	2
	No air conditioning installed	Not Applicable	2
	House floor area ≤ 1,000 ft^2	1	1
	House floor area ≥ 2,500 ft^2	-1	-1
	Energy Star Fans[7]	1	1
	Install 1 kW or greater of solar electric	1	1

1 Cool roof with three-year aged solar reflectance of 0.55 and 3-year aged thermal emittance of 0.75 or 3-year aged solar reflectance index of 64.
2 One cfm/ft^2 attic venting.
3 Radiant barrier shall have an emissivity of no greater than 0.05 as tested in accordance with ASTM E-408. The radiant barrier shall be installed in accordance with the manufacturer's installation instructions.
4 Walls with covering with a reflectance of ≥ 0.64.
5 Energy Star rated appliances include refrigerators, dishwashers, and clothes washers and must be installed for the Certificate of Occupancy.
6 The wall projection factor is equal to the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first floor level to the bottom most point of the overhang.
7 All air conditioning systems in the house must be ductless to qualify for this credit.
8 Install ceiling fans or whole-house fans in all bedrooms and the largest space that is not used as a bedroom.

(39) Amending Subsection R501.4. Subsection R501.4 is amended to read:

R501.4 Compliance. Alterations, repairs, additions, and changes of occupancy to, or relocation of, existing buildings and structures must comply with the provisions and regulations for alterations, repairs, additions, and changes of occupancy to, or relocation of, respectively required by this code.

(40) Amending Subsection R503.1.1. Subsection R503.1.1 is amended by adding the following exception and footnote to the exception to read:

7. When uninsulated roof sheathing is exposed during alteration, a minimum of two of the following shall be installed:

a. Energy Star compliant roof covering;

b. Radiant barrier;

c. Attic ventilation via solar attic fans or ridge ventilation or gable ventilation; or

d. A minimum of two exceptions listed in C402.3.

Footnote to exception: Shake roofs on battens shall be replaced with materials that result in equal or improved energy efficiency."

A BILL FOR AN ORDINANCE

SECTION 4. This ordinance takes effect 90 days after its approval.

INTRODUCED BY:

Ann Kobayashi (br)

DATE OF INTRODUCTION:

May 6, 2019
Honolulu, Hawaii

Councilmembers

APPROVED AS TO FORM AND LEGALITY:

Deputy Corporation Counsel

APPROVED this _____day of _____, 20 _____.

KIRK CALDWELL, Mayor
City and County of Honolulu